ECONOMIC DISPATCH PREDICTION FOR POWER FENERATION USING ARTIFICIAL NEURAL NETWORKS

AHMAD RADZI BIN SABTU

A project thesis is presented in partial fulfillment of the requirements for an award of the Bachelor of Engineering (Hons.) Electrical

FACULTY OF ELECTRICAL ENGINEERING

UNIVERSITY TEKNOLOGI MARA

MALAYSIA

JULY 2012

ACKNOWLEDGEMENT

In the name of ALLAH. S.W.T, the most Beneficent, the most Merciful. It is with the deepest sense of the Al-Mighty Allah that give me strength and ability to complete this project. All good aspirations, devotions and prayers are due to Allah whose blessing and guidance have helped me throughout the entire project.

Firstly, I would like to acknowledge and express my sincere gratitude towards my supervisor Assoc. Prof. Bibi Norasiqin Sheikh Rahimullah for her concern, valuable time of consultation and advice, guidance and patience in supervising my project from the beginning until the completion of this project thesis

My appreciation goes to the presentation panels, Assoc. Prof. Dr. Ismail Musirin and Puan Aida Sulinda Kusim for their dedication in advice and willingly gives their ideas and suggestions for completing this project especially in how to use MATLAB software to interpret using Artificial Neural Network programming.

Last but not least, my special thanks to all my friends, Mohd Amirul, Mohd Khairul Azlan and Mohd Azril for the valuable help and motivation given in completing this project. Most of all to my beloved family, especially my mother who always by my side, thank you for the endless love and encouragement they gave and for being so understanding.

ABSTRACT

This paper presents an economic dispatch prediction of electrical power system by using artificial neural networks (ANN). The objective of economic dispatch for generating units at different loads is to have total fuel cost at the minimum point. There are several methods which known as conventional methods that can be used to solve economic dispatch problem such as Lambda (λ) iteration method, Lagrange multiplier method and Newton Raphson method. However, the load variation is an obstacle in optimal dispatch of conventional methods. The proposed method has been tested on a three units system and the results are compared with the results obtained from Lambda iteration method.

Keywords-

Economic dispatch; neural network

TABLE OF CONTENTS

	PAGE
DECLARATION	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF SYMBOLS AND	viii
ABBREVIATIONS	

CHAPTER 1

INTRODUCTION	
1.1 BACKGROUND	1
1.2 OBJECTIVE	2
1.3 PROBLEM STATEMENT	2
1.4 ORGANIZATION OF PROJECT REPORT	3

CHAPTER 2

ECONOMIC DISPATCH	
2.1 INTRODUCTION	4
2.2 POWER SYSTEM OPERATIONAL PLANNING	5
2.3 LITERATURE SURVEY	7
2.4 BASIC THEORY OF ED	9
2.4.1 Fuel Cost Function	10
2.4.2 Incremental Fuel Cost	12
2.5 CONSTRAINTS IN SOLVING ED	13

CUADTED 2

CHAPTER 3	
ARTIFICIAL NEURAL NETWORK	
3.1 INTRODUCTION	15
3.2 ARTIFICIAL NEURAL NETWORK	15
3.2.1 Feedforward Multilayer ANNs	17
3.2.2 The Structure Of ANN	17
3.3 BACKPROPAGATION ALGORITHM	19
CHAPTER 4	
METHODOLOGY	
4.1 INTRODUCTION	21
4.2 FLOW CHART FOR OVERALL PROJECT	22
4.3 FLOW CHART OF ED USING POWER SYSTEM TOOLBOX	23
4.4 FLOW CHART FOR ANN PROGRAM	24
CHAPTER 5	
RESULTS AND DISCUSSIONS	
5.1 INTRODUCTION	27
5.2 PROBLEM: 3 GENERATOR TEST SYSTEMS	27
5.2.1 Result for Training	27
5.2.2 Result for Testing	30
5.2.3 Comparison of Performance	34
CHAPTER 6	
CONCLUSION AND RECOMMENDATION	
6.1 CONCLUSION	35
6.2 RECOMMENDATION	36
REFERENCES	37
APPENDIX A	40
APPENDIX B	41
APPENDIX C	46